

**Publication Draft-Performance Specification
Platform Modifications (PMOD) to Rifles and Carbines
8 June 2001**

1. Scope: This draft document establishes the preliminary performance requirements for the SOPMOD Platform Modifications to the M16/M4-series rifles and carbines (PMOD). This document is not the final specification for the PMOD, rather represents the current operational and technical vision of PMOD that will meet future operational requirements.

The specification is derived from formal market surveys. It does not represent any current commercial system in particular; rather the specification is a hybrid of performance features that government operational and technical personnel consider the optimum combination for a successful acquisition of new or improved combat capabilities.

Where a performance range, rather than exact parameter, is appropriate, the requirement is shown for Threshold (T), or lowest acceptable standard, and Objective (O) the highest standard that may be technically affordable.

This draft is published for industrial, academic, and government comment. Comments obtained from this public interaction will help define the final specification, which will be included in the future solicitation. Potential offerors, academia, and government may suggest additional capabilities and/or proposed test protocols, or entirely new and innovative concepts that will meet the requirements.

This specification is closely interrelated with a tandem specification for the Enhanced Grenade Launcher Module (EGLM). The reason that the specifications are separated is to establish a baseline set of host rifles and carbines in PMOD configuration, and to achieve other immediate rifle and carbine objectives, by the year 2002, then to allow follow-on testing of candidate EGLM systems on PMOD baseline rifles and carbines for initial EGLM procurement in 2004.

2. Documents and References

2.1 Government Documents

2.1.1 Specifications and Standards: The following specifications and standards form a part of this Performance Specification and will be used for guidance or to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Specifications, Military:

MIL-W-13855	General Specification for Weapons, Small Arms and Aircraft Armament Subsystems
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MIL-C-53072	Chemical Agent Resistant Coating
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(CARC) System Application Procedures and Quality
Control Inspection

Standards, Military:

MIL-C-71186(AR) M4A1 Carbine

MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-810E	Environmental Test Methods and Engineering Guidelines
MIL-STD-1913	Dimensioning of Accessory Mounting Rail For Small Arms Weapons
MIL-STD-1916	DOD Preferred Methods for Acceptance of Product
MIL-STD-961	Department of Defense Standard Practice for Defense Specification
MIL-STD-105	Sampling Procedures for Inspection by Attributes.
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-781	Reliability Tests: Exponential Distribution.
MIL-HBK-454	[Title]

NAVSEA SW010-AD-GTP-010 Small Arms and Special Warfare Ammunition

ITOP 4-2-602 Rough Handling Tests

MILSTD 1367A Packaging, Handling, and Storage Transportability Program Requirements for Systems and Equipment

TOP [Title] Rifles

TOP [Title] Grenade Launchers

Guidance for Approval and Use of Army Power Supplies

2.1.2 Operational Test References:

An independent Operational Test and Evaluation (OT&E) activity will develop a test plan containing measurable operational criteria, normally using STRAC Manual Chapter 5, Infantry Weapons Systems, and always using applicable OT&E laws, regulations, and guidance. Effectiveness and Ease of Use

User-developed requirements and performance specifications will be finalized during the research process. These are the dominating documents for development of operational criteria:

DoD 5000.2-R, Interim Regulation, Mandatory Procedures for Major Defense Acquisition Programs 1 January 2001.
(Provides general overarching guidance on the conduct of OT&E)

STRAC Manual, Chapter 5, Infantry Weapons Systems
(Provides a procedural scoring baseline for weapons performance, and may be used as the basis of a tailored OT&E live-fire scoring procedure.)

Army Regulation 71-3, Test and Evaluation
(Contains regulatory guidance for the planning, administration, and execution of OT&E.)

Special Operations Forces Missions Design Considerations, 11-98
(Provides a narrative of typical SOF mission scenarios to aid in OT&E event planning)

2.2 Order of Precedence: In the event of a conflict between the text of this document and the references cited, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Copies of military specifications and standards are available from: Standardization Document Order Desk, 700 Robbins Ave., Bldg #4, Section D, Philadelphia, PA 1911-5094.)

3 PMOD System Requirements

3.1 Item Definition: Platform Modifications (PMOD) to the M16/M4-series of rifles and carbines are modifications that allow rigid, repeatable mounting of the Enhanced Grenade Launcher Module (EGLM) (See Note below), without contacting the M16/M4 variant rifle barrel. PMOD will provide improved operational performance characteristics over the currently fielded SOPMOD RIS (NSN 1005-01-416-1089). To ensure system balance, concurrently fielded modifications are new SOPMOD rifle/carbine components, sub-assemblies or modifications that enhance reliability, endurance, safety, operational performance, and ergonomics as compared to the current USSOCOM carbines. Parts incorporated into PMOD will be, in order of priority, an improved magazine, improved bolt assembly, and improved/extended life barrel, all other parts that enhance reliability, endurance, safety, and operational performance. Specific modernized formats for the platform modifications include (1) a modernized standard-length carbine, (2) a Special Purpose Receiver (SPR) optimized for precision fire, and a shortened Close Quarter Battle Receiver (CQBR) optimized for combat operations in confined spaces.

3.1.1 Missions: Joint Special Operations Forces (SOF) requires versatile weapons to cover defensive and offensive operations in SOF mission scenarios. These missions include Counter-terrorism (CT), Counter-narcotics (CN), Special Reconnaissance (SR), Strike Operations (SO), and Foreign Internal Defense (FID). These missions often place operators in diverse operational situations and roles including Military Operations in Urban Terrain (MOUT) and Close Quarters Combat

(CQB), as well as long-distance standoff situations and Over The Beach (OTB) operations. The M16/M4 variant with PMOD shall be a man portable, shoulder fired weapon used primarily to incapacitate or suppress enemy personnel that will be tailored to these SOF mission scenarios. This tailoring will increase the weapon's lethality through fire control and target acquisition day and night both during CQB and to ranges of up to 600 meters (precision) and 800 meters (suppression).

3.1.2 System Characteristics (States and Modes of Use): SOF shall fire the PMOD rifles and carbines in the standing, kneeling, sitting, and prone positions, both supported and unsupported. SOF shall utilize the PMOD rifles and carbines in extreme environments including desert, arctic, jungle, marine, and high altitude, in weather extremes to include rain, hail, snow, and dust storms. SOF shall fire the PMOD rifles and carbines in the surf zone while prone, exposing the weapon to flooding and re-flooding with saltwater/sand slurry from incoming waves. The system must withstand exposure to extreme conditions up to and including extended periods in a surf zone, immersion at a depth of 66 feet, temperatures from -45 degrees Celsius to +71 degrees Celsius, and corrosive environments including salt fog and humidity. States and Modes of Use will be used to develop both developmental and operational test events.

3.1.2.1 Transport and Storage: The system shall withstand transport and storage according to MILSTD 1367A Packaging, Handling, and Storage Transportability Program Requirements for Systems and Equipment. The PMOD rifles and carbines must also survive immersion in salt water to a depth of 66 feet (T), 200 feet (O) for 2 hours. Operators will also parachute with the EGLM from aircraft. The system must withstand transportation at 35,000 feet altitude for 2 hours.

3.4 Key Performance Parameters: Key performance parameters are must-pass testing events. Any offering failing any of the KPP's will be removed from further testing and will not be further tested or considered for contract award.

3.4.1 KPP1: INTEROPERABILITY (1). The parts/assemblies will be compatible with current standard 5.56mm lower receivers. Several components required depend on other components for interface. Components offered can be designed to interface with standard interfaces/components when possible or can be designed to work in combination with other components provided by that contractor or another contractor (Government is not responsible for any contractor-to-contractor interfacing). Any proposed items that are dependent upon other proposed items due to non-standard design or integration become linked (when one fails the other fails).

3.4.2 KPP2: WEIGHT. Parts/assemblies will add no more than 12 ounces (T); will reduce the current weight (O) of the M16/M4 Variants. This KPP does not include Muzzle Brake/Sound Suppressor assemblies.

Current Baseline Weights:

SPR Precision Platform (upper receiver assembly only)	6.2 lbs.
M4A1 Carbine (complete weapon)	6.6 lbs.
CQB Receiver Platform (upper receiver assembly only)	4.3 lbs.

Rationale: Operational Suitability

3.4.3 KPP 3, AMMUNITION INTEROPERABILITY (2). PMOD shall fire all currently fielded 5.56mm x 45mm NATO ammunition. This list includes, but is not limited to: Ball M193 (A066), Ball M855 (A059), Tracer M196 (A068), Tracer M856 (A063), Blank M200 (A080).

3.4.4 KPP 4, INTERFACE: PMOD interface shall allow rigid and repeatable mounting of the future Enhanced Grenade Launcher Module (EGLM) without contact to the host rifle/carbine barrel. If the interface is not MILSPEC 1913, or other public information, the offeror's technical proposal must contain a provision or offer that if accepted, will allow the government to publish a Level 3 Drawing of the interface surfaces (male and female) only, and to develop and Interface Control Document (ICD).

Note: The EGLM is a future effort that is scheduled for fielding in the year 2004. Offerors must provide an interface that will attach the EGLM close to the M16/M4 variant rifle barrel, but not contacting the barrel, using either the M1913 Standard rail, or an interface of other design that will be published by the government to accommodate standardization of the EGLM interface. Due to "Open Systems" requirements in DoD 5000.2-R, the government must have the capability publish a Level 3 Drawing or ICD of the interface surfaces (male and female) only, and to assign a MILSPEC. It is not the intent of this specification to obtain a Level 3 drawing of the entire interface part, rather the interface surfaces only, to permit fair and open competition of the future EGLM, and other future SOPMOD systems that will be affixed in the 6:00 position, such as the Integrated Pointer Illuminator Module (IPIM) and the Enhanced Shotgun Module (ESM).

Rationale: A rigid mounting solution is sought that will allow a free-floating rifle barrel. This will increase the performance of the weapon and maximize the marksmanship skills of Special Operations Forces (SOF). It will also allow for sling and bipod supported fire without deflecting the barrel and changing the point of impact. Also by decreasing the offset between the axis of the rifle/carbine barrel, and current and future accessories, ergonomic and operational capabilities will be enhanced for all future systems that mount in the 6:00 position on the forearm areas of rifles and carbines.

3.4.5 KPP 5, SOPMOD INTEROPERABILITY (3): The PMOD, when mounted on the M16/M4 Variant shall allow the attachment of and not interfere or be operationally hindered by currently fielded SOPMOD kit items with the exception of the following obsolescent items: RIS (NSN 1005-01-416-1089), M203 QD Mount (NSN 1055-01-416-1090), and the SOPMOD Sling. Barrel threads for attaching suppressors shall be 28, ½ inch standard threads.

3.4.6 KPP 6, RELIABILITY: PMOD shall be capable of firing 6000 rounds with not more than the number of malfunctions listed below in Table 1. Any malfunction that is not possible to correct within 10 seconds, without the use of tools, is unallowable. This parameter is also tested as an APP.

Table 1: Malfunctions allowed and Firing Sequence

<u>Malfunction By Type</u>	<u>Number Allowed</u>
Failure of Bolt to Lock	2
Failure to Fire	2
Failure to Feed	4
Failure to Eject	2
Failure to Chamber	3
Failure to Extract	1
Bolt Fails to Hold to Rear	3
All Other Malfunctions	0
Total of above malfunctions allowable	9

Notes:

Any malfunction that is not possible to correct within 10 seconds, without the use of tools, is unallowable. The occurrence of such a malfunction will fail the malfunctioning PMOD, and further testing will not be conducted.

All malfunctions will be recorded regardless of whether they are chargeable to the PMOD. If a malfunction is determined to not be attributable to the PMOD, the malfunction will be corrected and testing will continue.

In the event of a Failure of Bolt to Lock malfunction, test personnel will engage forward assist. Failure of the forward assist to completely lock the bolt will be considered a malfunction under the All Other Malfunctions column.

Each individual PMOD tested shall not exceed the allowable number for each malfunction in the list or the test shall have failed. If the PMOD meets the individual allowable malfunctions and exceeds the cumulative total allowable malfunctions, the test shall have failed.

Firing Schedule:

Magazine 1	30 rounds automatic fired in 3 to 5 round bursts
Magazine 2	30 rounds automatic fired in 1 continuous burst
Magazine 3	30 rounds semi-automatic rate of 30 rounds per minute
Magazine 4	30 rounds semi-automatic rate of 30 rounds per minute

Total 120 rounds

After each cycle, barrel will be allowed to cool to a temperature that will allow test personnel to hold the barrel in their bare hand. This cycle will be fired 50 times for a total of 6000 rounds. PMOD's will be cleaned and lubricated at the beginning of the test and after every 10 cycles.

Rationale: PMOD must, at a minimum, meet or exceed the standard of reliability for the M4 Carbine. Modified M4 Specification are used for the table of malfunctions and firing schedule listed above. Changes: Sample of four carbines with different allowance for malfunctions not used. Every PMOD tested must meet standard described above. Firing schedule changed for Magazine 3 and 4 – changed from "rate of 30 rounds in 1-3 minutes" to "rate of 30 rounds per minute."

3.4.6 KPP 7, SAFETY: Firing of the PMOD shall not pose a safety hazard to the operator during handling, transportation, storage and use. This parameter may be tested in both a Developmental Test (DT) and an Operational Test (OT) environment.

3.5 Cost as an Independent Variable (CAIV): CAIV shall be used to manage the cost of acquiring the EGLM, and to obtain a "Best Value acquisition. CAIV is treated as an independent specification. Current estimates from market survey indicate that the maximum Procurement Average Unit Cost (PAUC) of the PMOD, with accessories, will be approximately \$1,000.00 each, (T) and the minimum PAUC will be approximately \$350.00 (O).

In the CAIV process, offerors have the latitude to propose any enhancements, which they believe, provide benefit to the Government. In order of priority, the desired enhancements are as follows:

1. Greater Reliability and Endurance (All Environments and Modes of Use)
2. Increased Ease of Use or Speed of Target Engagement
3. Greater Accuracy
4. Reduced Weight
5. Longer Warranty Coverage

Offerors pricing tables will be used for CAIV evaluation. It is important to note that the PMOD will be eventually procured as a set of parts, or permanent sub-assemblies, for final assembly at NSWC Crane; therefore depot-level assembly labor should not be included in the offeror's price calculations.

Depot-level assembly/disassembly times/labor/special tools cost will be scored as part of CAIV and life cycle cost analysis. Additionally, during the testing process, a preliminary Life Cycle Cost Estimate (LCCE) will be developed using failure information derived from testing and other logistics considerations. These will be combined with other pertinent pricing data (such as cost-effectiveness) to develop a recommendation to the Source Selection Authority (SSA).

3.6 Additional Performance Parameters (APP): APP's are best value testing events. Failure to meet the requirement specified in an APP does not remove a submission from further testing or from consideration for contract award. APP's are evaluated to provide a best value determination and are used in a CAIV analysis.

3.6.1 General APP Requirements: Note: APP's 1,2,and 3 are priority APP's. These specific requirements receive a higher evaluation weight than the remaining APP's. Offerors may bid separately on APP's 1 Magazine and APP3 Barrels, (and without submitting an entire PMOD package.

3.6.1.1 APP 1, MAGAZINE: It is an objective of PMOD to be able to fire, with high reliability, all forms of current M16-type magazines, to include low-quality, worn, and damaged magazines. However, to achieve the required levels of reliability, PMOD shall

require an improved 30 round magazine, which provides improved reliability and durability as compared to the standard issue aluminum magazine. This magazine should be more crush/dent resistant than current magazines and also should meet the environmental requirements listed below. This magazine must be compatible with currently fielded M16/M4 rifles and carbines.

Notes: (1) Offerors submitting magazines separately are advised that their samples will be tested on baseline M4A1 carbines. (2) Enhanced sustained fire/high capacity magazines are also sought, via new design, or a device to group magazines together.

Rationale: The currently fielded M16/M4 magazine has significantly contributed to malfunctions. Rough spring/follower/housing interface, poor resistance to denting/crushing, and poor corrosion resistance, and poor quality control exacerbate feeding problems. An improved magazine may eliminate some weapons malfunctions as a low cost improvement.

3.6.1.2 APP 2, BOLT: PMOD shall incorporate an improved bolt assembly (and bolt carrier/related operating system parts, if required) that will provide increased reliability, eased/minimized maintenance, and reduced corrosion. The bolt life goals are 30,000 rounds without breakage and 15,000 rounds without detectable lug cracking (cracking is defined as any visual crack indication when examined by magnetic particle inspection techniques). Bolt life is also considered expired when headspace reaches the point that the field reject gage allows the bolt to fully close.

Notes: Changes/improvements in materials, platings, and design (if deemed necessary by the offeror) are allowed.

Rationale: The currently fielded M16/M4 bolt is a major contributor to malfunctions. Numerous deficiencies have been noted including cracked/broken lugs, cracked/broken cam housing recess, insufficient extractor and ejector spring force, worn gas rings, and broken extractors. An improved bolt may eliminate some weapons malfunctions as a low cost improvement.

3.6.1.3 APP 3, EXTENDED LIFE BARREL: PMOD shall incorporate an improved barrel that will provide increased accuracy, endurance, heat dissipation and non-explosive failure when overheated by heavy firing. No provision is required for M203 Grenade Launcher attachment. The outer barrel profile goal is decreased weight and increased barrel safety and accuracy (no M203 mounting cut) while meeting the barrel life requirements listed in OPN APP 3 below, as well as non-explosive failure and heat dissipation goals. New barrels shall exhibit initial accuracy of 1MOA (objective) and 2MOA (threshold) when tested firing a government designated accuracy cartridge with 77 gr. bullet, and shall exhibit a minimum accuracy at the 15000 round endurance point of 6 inches at 100 yards, when fired at a schedule defined in OPN APP 3 below, using Government Standard M855 ball ammunition conforming to drawing 9342868. Barrels submitted for the Precision PMOD shall meet an improved initial accuracy standard of .5MOA (objective) and 1.5MOA (threshold).

Notes: (1) Barrel offerors who wish to submit barrels alone: Such barrel samples, prior to receipt at NSWC Crane, must be contoured, gas-ported, and have barrel extensions attached by the offeror, using the current Level 3 SPR barrel drawing (available from the TPOC, Mr. Paul Miller). The external contours of the barrel represent maximum dimensional limits; offerors are free to utilize their own coatings and geometries (except barrel length) to achieve ELB goals. The barrels will then be tested in baseline (SPR) weapons and other fixtures for accuracy, endurance, reliability and corrosion testing. (2) Barrel offerors who wish to submit barrels as part of other PMOD requirements: If the offered barrel is designed to operate with a unique gas tube or gas system, unique bolt or bolt assembly, unique front sight, or other unique part, then each barrel shall come with its own set of unique parts, and will be contoured, chambered, and finished to the offeror's design. The gas port diameter shall be a nominal diameter of 0.062 inches unless the barrel is interdependent with a specialized gas tube/system or other parts. In the case of unique included parts, if one part fails the other is considered failed as well.

Rationale: Specialized barrels are required for the SPR and CQBR. The currently fielded barrels do not exhibit the accuracy and endurance characteristics required by SOF. Currently fielded barrels frequently do not endure one operational cycle (pre-mission training and deployment).

3.6.1.4 APP 4, UPPER RECEIVER: An improved upper receiver unit is desired which has improved reliability, corrosion resistance, durability, endurance, and ergonomics as compared to the current standard hard coat anodized aluminum receiver. The PMOD upper receiver shall float the M16/M4 Variant rifle barrel so that no portion of the rail system will touch any part of a barrel of a diameter up to 1 inch (floating) or the gas system. If non-standard designs are used, all nonstandard mating components necessary for function shall also be provided. The upper receiver shall include a forward bolt assist, case deflector and integral 1913 rail. If a submission increases the height above bore of the 12:00 rail, retrofit mounts must be provided to adapt existing SOPMOD aiming accessories to original height. The submitting vendor must assume the cost of these mounts, or include that cost in the vendor's bid proposal for best value analysis. It is also a goal that the upper receiver includes both front and rear integral folding sights, which spring to, and lock in, the upright position when deployed. These sights should maximize available rail space. It is desired that a 4-quadrant rail system be provided as part of the upper receiver assembly (see interface APP 6). The rail system and any associated components shall not be damaged due to exposure to the severe heat of emergency firing which results in a barrel temperature of approximately 1100 degrees F. As a goal the user should be able to continue holding the fore-end comfortably throughout the firing to reach this temperature.

Note: This provision may be met with (1) parts that add to the current upper receiver, (2) a stand-alone monolithic upper receiver, or (3) other unforeseen design alternatives.

3.6.1.5 APP 5, INTERFACE: The PMOD interface shall be part of a rigid/integral handguard system that will float the M16/M4 variant barrel and reliably provide a fixed MILSPEC 1913 rail at the 12:00 position from the back sight to the front sight, and as well as the capability to mount rails at the 3:00, 6:00, and 9:00 positions on the fore-end. 12:00, 3:00, and 9:00 fore-end rails will exhibit no detectable shift in zero during extreme rough handling in OT&E (T). The 6:00 rail will also exhibit no detectable shift in zero during extreme rough handling (O). Compatible front and back flip-up/fold-down sights that lock (or are held by spring tension) in the up position are required. It is desired that the sights be adjustable for windage and elevation in ½ MOA increments, and be capable of ranges out to 600m. The adjustments shall be tactile and shall not require the use of tools. It is desired that the adjustment device incorporate a locking mechanism to prevent inadvertent movement, once the zero is set.

3.6.1.6 APP 6, M203 MOUNTING INTERFACE: It is anticipated that the EGLM will not begin fielding until 2004, and that it will take several years after that to fully phase-replace the M203 in SOF. PMOD shall, therefore, include a mounting kit or modification kit for the M203 Grenade Launcher, which will require minimal or no modifications to the M203 Grenade launcher. As a goal, this kit shall allow for full floating of the M16/M4 variant rifle barrels. The M203 can be modified to allow it to mount directly to a 6 o'clock rail (fixed or removable) if the mating rail system is also offered.

3.6.1.10 APP 10, Exterior Finish: The PMOD shall have a dull, non-reflective dark gray or taupe exterior finish.

3.6.1.13 APP 13, Workmanship: Workmanship shall be in accordance with ANSI IPC J-STD-001A.

3.6.2 Operational APP Requirements:

3.6.2.1 OPN APP 1, RELIABILITY: The system shall demonstrate a minimum acceptable Mean Rounds Between Failure of at least 6000(threshold) and 15000 (objective). A Failure shall be defined as any one or more of the following: (1) The occurrence of a malfunction. A malfunction is any cessation of any ability of the system or any of its components to perform its intended function. A system is the item or combination of items that are under test. (2) The occurrence of a condition, which causes an unwarranted safety hazard to personnel. (3) The occurrence of broken or unserviceable part that renders the weapon inoperable or unsafe if firing is continued. Failures which are attributable to ammunition or operator shall not be charged against the weapon; they will however, be recorded.

Rationale: Modified M4 Specification. Operator Survivability.

3.6.2.3 OPN APP 3, ENDURANCE: The PMOD shall demonstrate a minimum system endurance of 15000 rounds 5.56mm threshold and 30000 5.56mm rounds objective, without mechanical or barrel failure, when cleaned every 2000 rounds and fired according to the schedule described

below. Mechanical failure is defined as the occurrence of a condition, which causes an unwarranted safety hazard to personnel, or the occurrence of one or more broken or unserviceable parts that render the weapon inoperable. Failures which are attributable to ammunition or operator shall not be charged against the weapon; they will however, be recorded. Barrel failure is defined as inability to fire an accurate 10 round group. An accurate 10 round group is defined as a group with an extreme spread of less than 6 inches at 100 yards when firing Government Standard M855 ball ammunition conforming to drawing 9342868. (NOTE: SOPMOD PMO intends to use certified lots of M855 Ball, or other high-accuracy test ammunition, to ensure that only weapon accuracy, and not ammunition accuracy, is being measured) The PMOD Grenade Launcher Interface shall meet the same endurance standard as defined in EGLM Specification.

Firing Schedule:

Magazine 1	30 rounds automatic fired in 3 to 5 round bursts
Magazine 2	30 rounds automatic fired in 1 continuous burst
Magazine 3	30 rounds semi-automatic rate of 30 rounds per minute
Magazine 4	30 rounds semi-automatic rate of 30 rounds per minute

Total 120 rounds

After each cycle, barrel will be allowed to cool to a temperature that will allow test personnel to hold the barrel in their bare hand. This cycle will be repeated until the PMOD fails or objective has been met. PMOD's will be cleaned and lubricated at the beginning of the test and after every 10 cycles.

Rationale: PMOD must, at a minimum, meet or exceed the standard of endurance for the M4 Carbine. Modified M4 Specification was used for the firing schedule listed above. Changes: Firing schedule changed for Magazine 3 and 4 - changed from "rate of 30 rounds in 1-3 minutes" to "rate of 30 rounds per minute."

3.6.2.4 OPN APP 4, ERGONOMICS: PMOD shall incorporate parts and assemblies that improve ergonomics of the weapon. These parts and assemblies may include, but are not limited to: pistol grip, forward pistol grip, ambidextrous safety, ambidextrous magazine release, sling and attachments, and collapsible buttstock. Descriptions of each item are included below. These ergonomic requirements may be tested in an operational environment.

Rationale: Operational Suitability.

3.6.2.4.1 CHARGING HANDLE: PMOD shall incorporate an improved charging handle that is optimized for speed and ease of use while minimizing snagging tendencies. A goal of an improved charging handle is that it provides a seal against and/or redirects escaping propellant gases away from the shooters face. It should aid in ease of weapon charging especially when receiver mounted optics limit handle accessibility. This requirement may be tested in an operational environment. As an objective, the charging handle should be ambidextrous and intuitive.

3.6.2.4.2 MAGAZINE CATCH/RELEASE: An ambidextrous magazine catch/release that offers increased reliability over the current catch.

It shall not result in accidental release of a magazine during standard weapon handling, and shall not contribute to feeding malfunctions.

3.6.2.4.3 SAFETY SELECTOR: A Safety/Selector part or assembly is desired which includes the same internal cam surfaces as the standard rifle/carbine selector. As a threshold the lever will be capable of being manipulated from both sides of the weapon. As a goal the lever not being used (depending on whether the shooter is right or left handed) should not interfere with the selector operation when the shooter uses a conventional grip.

3.6.2.4.4 TRIGGER: An improved trigger is desired which results in a consistent 3-8 lb breaking force that is adjustable by organizational level maintenance. Goals are reliability, low maintenance, improved corrosion resistance with a life of 30,000 rounds regardless of firing schedule, temperatures, and cooling methods.

NOTE: A discussion exists over the exact nature of this trigger requirement. The objective of the requirement is to increase accuracy and speed of target engagement. SOF operators are in disagreement over whether the trigger should be single stage or double stage, the majority requesting single stage. USSOCOM PMO is concerned that light double stage triggers are proven safe, whereas light single stage triggers may not meet safety requirements. Core trigger safety requirement is that the trigger, if partially depressed but not fired, must re-cock itself to full sear position when finger pressure is removed.

3.6.2.4.5 PISTOL GRIP: An ergonomic rear pistol grip is desired. It shall maintain an equal or greater level of durability compared to that of the standard M16A2/M4A1 grip. It shall include a well-shaped textured grip surface, and it shall balance trigger pull length with easy of safety manipulation.

3.6.2.4.6 FORWARD PISTOL GRIP: An ergonomic forward grip is desired. Goals are adjustability for angle front to rear up to 35 degree each direction. It shall attach to a Mil Std 1913 rail and be compatible for use with standard SOPMOD Kit pressure switches, or may incorporate alternative, improved switching controls. High durability and heat resistance are goals. The pistol grip will be tested in an operational environment against the current SOPMOD pistol grip as baseline.

3.6.2.4.7 TACTICAL SLING: A versatile sling system is desired. Low noise, high strength/durability and high user acceptance are goals.

3.6.2.4.8 COLLAPSIBLE BUTT STOCK: An improved collapsible butt stock is desired which provides more effective cheek weld during the integrated act of aiming and firing the weapon. High durability and heat resistance are goals. Although a government-created design will be placed in this competitive acquisition process, other designs are of strong interest.

3.6.2.5 OPN APP 5, CONTROLLABILITY: Parts/assemblies shall provide a significant, measurable, increase in the controllability of the carbine while firing in the semi-automatic and full automatic mode. This parameter will be measured by number of hits on target in tactical

situations, and may be tested in an operational environment.

NOTE: This requirement has a three-fold purpose (1) to increase semiautomatic and automatic accuracy in simulated combat live-fire scenarios, (2) to extend the amount of time that enemy targets can be suppressed with full automatic fire with a given amount of ammunition, and (3) to increase weapon part life by slowing moving part velocities/reducing part stress and strain. This requirement is also in controversy. The SOPMOD Operational Requirements Document cites 500 rounds per minute, but many operators believe that that 500rpm is too slow, and that 650rpm is more operationally suitable. The SOPMOD PMO observes that most automatic weapons, for the most part, increase in cyclic rate over the life of the weapon. This APP will be tested both in OT&E and DT for greatest combat capability over the life of the weapon.

3.6.2.6 OPN APP 6: Parts/assemblies shall be rated as acceptable to the user through formal Operational Test & Evaluation. Operational Test & Evaluation will be conducted to determine (in order of importance) operational suitability, operability, and supportability. This OT/E will be conducted IAW applicable US Law and Service Regulations. The PMOD rifles and carbines shall be quickly, effectively, and easily employed by the operator while wearing standard battle dress uniform, and while wearing the full range of standard environmental protective clothing, including MOPP 4 and cold weather protective clothing (excluding artic mittens). The results of actual special operations scenarios during OT&E shall be included in effectiveness and ease-of-use testing evaluation.

Considerations for the effectiveness, ease of use and non-complexity of operation may include, but not be limited to, the following:

- Scores and times in the negotiation of operational live-fire tests
- OTB live-fire performance
- Live fire performance in environmental/weather extremes
- Ease of mounting the EGLM candidate system/M203 retrofit kit to the PMOD weapon
- Ease of achieving boresight and/or zero
- Ability to aim and fire the weapon at all effective ranges from all firing positions.
- Ability to understand the operation of the PMOD (intuitive controls)
- Ease of maintenance, lack of required maintenance
- Ease of removal of the EGLM candidate system /M203 retrofit kit to the PMOD weapon

Rationale: Operator Lethality and Survivability.

3.6.3 Environmental APP Requirements:

3.6.3.1 ENV APP 1, Operating/storage temperatures: PMOD shall exhibit neither damage nor degradation of performance when operated in a temperature environment of -46° to +49° C, stored (non-operating) in a temperature environment of -46° to +71° C, or when exposed to sudden temperature changes between -46° to +49° C inclusive.

3.6.3.2 ENV APP 2, Sand and Dust Environment: PMOD shall exhibit neither damage nor degradation of performance when exposed to sand and dust in accordance with MIL-STD-801E, method 510.3, procedures I and II.

3.6.3.3 ENV APP 3, Vibration: PMOD shall exhibit neither damage nor degradation of performance after vibration and rough handling typical of Special Forces missions. Actual operations may be included in testing, or test machines (e.g. cyclic load machines, etc.) may be used to simulate these environments. The weapon must function and show no significant shift in zero.

3.6.3.4 ENV APP 4, Drop: PMOD shall withstand shock (drop) testing, from 2 meters onto steel ¼" thickness, backed by concrete, individually in six (6) orientations (both ends and all four (4) sides) with no damage (other than cosmetic) or functional degradation.

3.6.3.5 ENV APP 5, Rough Handling: PMOD shall exhibit neither damage nor degradation of performance when subjected to a loose cargo vibration test in accordance with MIL-STD 810E, Method 514.4. The weapon must show no significant shift in zero.

3.6.3.6 ENV APP 6, Moisture: PMOD shall not exhibit damage, corrosion or degradation of performance resulting from being intermittently operated for not less than 10 consecutive days in a relative humidity from 59% to 88% and a temperature environment of +31° to +41° C inclusive, or when immersed for not less than two (2) hours under one (1) meter (3.3 feet) of water in a non-operating mode after being pre-heated and stabilized at -45° C.

3.6.3.7 ENV APP 7, Corrosion Resistance: PMOD shall not exhibit damage, significant corrosion nor degradation of performance due to exposure to a salt fog atmosphere consisting of 5 ± 1 percent of salt solution for a minimum of 240 hours.

3.6.3.8 ENV APP 8, Altitude: (tested on parts which may have cavities, such as hydraulic buffers) The PMOD shall not exhibit leakage, damage, or degradation of performance when subjected to a pressure equivalent to 35,000 feet of altitude for a period of 2 hours.

3.6.3.9 ENV APP 9, Chemical Compatibility: PMOD shall suffer no damage or degradation of performance when exposed to battlefield chemicals in accordance with MILSTD 810E.

3.6.3.10 ENV APP 10, Immersion: (tested on parts which may have cavities, such as hydraulic buffers) The PMOD shall not exhibit leakage, damage, or degradation of performance when subjected to immersion in water to a depth of 66 feet for 2 hours.

3.6.4 Maintenance and Logistic APP Requirements

3.6.4.1 LOG APP 1, Maintenance: The PMOD shall not increase operator maintenance time compared to the time of the M4A1 Carbine. As an objective, PMOD may be maintained by the operator using equipment in the standard M16 cleaning kit. The Mean Time To Repair (MTTR) at the unit level for the PMOD shall not MTTR for the M4A1 Carbine. The time to repair is defined as the total time required to restore the PMOD and mounts to operation, including diagnostic time. At Direct Support, the MTTR shall be one hour or less.

3.6.4.2 LOG APP 2, Interchangeability: The PMOD design and ILS programs shall conform to the guideline 7 of MIL-HDBK-454. The system design and ILS program shall ensure that the device assemblies, sub-assemblies and replacement parts physically and functionally interchange at the Organizational level without modification of the fielded equipment.

3.7 Pre-Planned Improvements, Upgrades and Product Growth

3.7.1 PPI APP1, Function with Non-Standard Munitions: The PMOD shall fire an upgraded generation of conventional munitions with improved accuracy and reduced dispersion when compared to the currently fielding munitions, and shall be insensitive to varying pressures of different ammunition types.

3.7.2 PPI APP2, Function with Various Muzzle Break/Suppressors: The PMOD shall fire reliably with both the current SOPMOD QD Sound Suppressor and an upgraded generation of Muzzle Break/Suppressors. PMOD should be insensitive to various muzzle devices.

4. Other Notes:

Certain requirements are yet to be developed, to include Preparation for Delivery, Basic Issue Items, Standard Equipment List, Accessories and Optional Equipment, Service Documentation, Operator Manual, Maintenance Manual with Maintenance Allocation Chart.